

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A method comprising:

detecting conditions in an electronic device fabrication facility including:

measuring fabrication data;

determining a route a workpiece included in a lot follows during fabrication, wherein the route includes at least one operation including a plurality of subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the workpiece and wherein the route includes no more than one of the plurality of subdivisions;

measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility, wherein the production data includes at least one measurement taken directly on the workpiece included in the lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data related to the entire electronic device fabrication facility and taken from sources not directly related to the at least one manufacturing process;

storing measured data relevant to the route the workpiece followed during fabrication including the measured production data and the measured facility data taken during the fabrication of the lot in a data set of the workpiece,

analyzing the data set of the workpiece;

determining current conditions using the analysis; and

applying a process control to the route based on the analysis.

2. (Currently Amended) The method of claim 1, wherein the route a particular that the workpiece follows is a subset of the entire manufacturing process.

3. (Previously Presented) The method of claim 1, wherein determining the route the workpiece follows during fabrication includes;

identifying operations that are linked in some manner;

determining subdivisions of the identified operations; and

developing a listing of all possible routes through the subdivisions of the operations that workpieces may traverse during fabrication.

4. (Previously Presented) The method of claim 3, wherein operations includes machines, chambers, processes associated with the route the workpiece follows.

5. (Original) The method of claim 3, wherein the manner of linking is by physical location.

6. (Original) The method of claim 3, wherein the manner of linking is by machine type.

7. (Original) The method of claim 3, wherein the manner of linking is by time of processing.

8. (Original) The method of claim 3, wherein the linking is by any other condition relevant to the fabrication process.

9. (Previously Presented) The method of claim 3, wherein the determining the subdivisions includes identifying all parts of the operation, machine, process, and chamber that have a substantially similar end product.

10. (Previously Presented) The method of claim 3, wherein all possible routes only includes probable routes through the subdivisions.

11. (Currently Amended) A method comprising:

detecting conditions in an electronic device fabrication facility including:

determining a particular route a workpiece included in a lot followed during fabrication, wherein the particular route is one of a plurality of routes, wherein the

particular route and each of the plurality of routes include at least one operation including a plurality of subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the workpiece and wherein the particular route includes no more than one of the plurality of subdivisions;

separately for each of the plurality of routes, measuring fabrication data items relevant to each of the plurality of routes including measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility, wherein the production data includes at least one measurement taken directly on the workpiece included in that lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data related to the entire electronic device fabrication facility and taken from sources not directly related to the at least one manufacturing process;

storing measured data relevant to each of the plurality of routes, including storing the measured production data relevant to the particular route the workpiece followed during fabrication and the measured facility data taken during fabrication of the lot in a data set of the workpiece;

analyzing the data set of the workpiece;

determining current conditions using the analysis; and
applying a process control to the particular route based on the analysis.

12. (Original) The method of claim 11, wherein the fabrication data items are measured from production data sources.

13. (Original) The method of claim 12, wherein the production data source is a test probe.

14. (Original) The method of claim 12, wherein the production data source is a parametric measuring device.

15. (Original) The method of claim 12, wherein the production data source is one in which film thickness is being measured.

16. (Original) The method of claim 12, wherein the production data source is one in which critical dimensions are being measured.

17. (Original) The method of claim 12, wherein the production data source includes any other data source that is relevant to the fabrication process and its condition.

18. (Currently Amended) A method comprising:

detecting conditions in an electronic device fabrication facility, including:

determining an exact route a wafer included in a lot actually followed during fabrication, wherein the exact route is one of a plurality of routes, wherein the exact route and each of the plurality of routes include at least one operation including a plurality of subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the wafer and wherein the exact route includes no more than one of the plurality of subdivisions;

separately for each of the plurality of routes, measuring fabrication data relevant to each of the plurality of routes including measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility, wherein the production data includes at least one measurement taken directly on the wafer included in that lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the wafer;

measuring facility data during the fabrication of the lot, the facility data from sources not directly related to the at least one manufacturing process and related to the entire electronic device fabrication facility;

storing measured data relevant to each of the plurality of routes, including storing the measured production data relevant to the exact route the workpiece wafer actually

followed during fabrication and the measured facility data during fabrication of the lot in
a data set of the wafer in a data processing device;
analyzing the data set of the wafer;
examining the analysis to determine current conditions; and
applying a process control to the exact route based on the analysis.

19. (Previously Presented) The method of claim 18, wherein measured data relevant to the route the wafer actually followed during fabrication is relevant based on physical proximity to the route.

20. (Currently Amended) The method of claim 18, wherein measured data relevant to the route the wafer actually followed during fabrication is relevant based on manufacturing result.

21. (Original) The method of claim 18, wherein the data processing device is a computer system containing a relational database on a storage device and executed on a processor.

22. (Previously Presented) The method of claim 18, wherein storing measured data in a data processing device includes:

adding a data item from the measured route fabrication data to the data set of the wafer;
and

relating the added data item to the previously stored data items by some point of data commonality.

23. (Original) The method of claim 22, wherein the point of data commonality is based on time.

24. (Currently Amended) A method comprising:

detecting conditions in an electronic device fabrication facility, including:

determining an exact route a workpiece included in a lot actually followed during fabrication, wherein the exact route is one of a plurality of routes, wherein the exact route and each of the plurality of routes include at least one operation including a plurality of

subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the wafer and wherein the exact route includes no more than one of the plurality of subdivisions;

separately for each of the plurality of routes, measuring fabrication data relevant to each of the plurality of routes including measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility, wherein the production data includes at least one measurement taken directly on the workpiece included in that lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data from sources not directly related to the at least one manufacturing process and related to the entire electronic device fabrication facility;

storing measured data relevant to each of the plurality of routes, including storing the measured production data relevant to the particular route the workpiece actually followed during fabrication and the measured facility data during fabrication of the lot in a data set of the workpiece in a data processing device;

analyzing the data set of the workpiece;

determining current conditions using the analysis; and

applying a process control to the exact route based on the analysis.

25. (Original) The method of claim 24, wherein the analysis is a statistical analysis.

26. (Original) The method of claim 24, wherein the analysis is a trend analysis.

27. (Original) The method of claim 24, wherein the analysis is a correlation study.

28. (Original) The method of claim 24, wherein examining includes comparing the analysis of the data set of the workpiece to expected conditions.

29. (Currently Amended) A method comprising:

responding to conditions in an electronic device fabrication facility, including:

measuring fabrication data;

determining a route a workpiece included in a lot followed during fabrication, wherein the route includes at least one operation including a plurality of subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the workpiece and wherein the route includes no more than one of the plurality of subdivisions;

measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility, wherein the production data includes at least one measurement taken directly on the workpiece included in the lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data related to the entire electronic device fabrication facility and taken from sources not directly related to the at least one manufacturing process;

storing measured data relevant to the route the workpiece followed during fabrication including the measured production data and the measured facility data taken during the fabrication of the lot in a data set of the workpiece,

analyzing the data set of the workpiece;

determining current conditions using the analysis;

comparing the current conditions to expected conditions; and

responding to the comparison, wherein responding includes triggering a warning when the current conditions depart from the expected conditions.

30. (Previously Presented) The method of claim 29, wherein the route the workpiece followed is a subset of the entire manufacturing process.

31. (Previously Presented) The method of claim 29, wherein determining the route a workpiece followed during fabrication includes;

identifying operations that are linked in some manner;

determining subdivisions of the identified operations; and

developing a listing of all possible routes through the subdivisions of the operations that workpieces may traverse during fabrication.

32. (Previously Presented) The method of claim 31, wherein operations includes machines, chambers, processes associated with the route the workpiece followed.

33. (Original) The method of claim 31, wherein the manner of linking is by physical location.

34. (Original) The method of claim 31, wherein the manner of linking is by machine type.

35. (Original) The method of claim 31, wherein the manner of linking is by time of processing.

36. (Original) The method of claim 31, wherein the linking is by any other condition relevant to the fabrication process.

37. (Previously Presented) The method of claim 31, wherein the determining the subdivisions includes identifying all parts of the operation, machine, process, and chamber that have a substantially similar end product.

38. (Previously Presented) The method of claim 31, wherein all possible routes only includes probable routes through the subdivisions.

39. (Currently Amended) A method comprising:

responding to conditions in an electronic device fabrication facility, including:

determining each route one or more workpieces included in a lot follows during fabrication, wherein each route includes at least one operation including a plurality of

subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the one or more workpieces and wherein each route includes no more than one of the plurality of subdivisions;

separately for each route, measuring fabrication data items relevant to each route including measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility;

determining an exact route a particular workpiece followed during fabrication;

measuring production data related to the particular workpiece, wherein the production data includes at least one measurement taken directly on the workpiece included in the lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data related to the entire electronic device fabrication facility and taken from sources not directly related to the at least one manufacturing process;

storing measured data items relevant to the exact route the particular workpiece followed during fabrication including the measured production data for the particular workpiece and the measured facility data during fabrication of the lot in a data set of the workpiece;

analyzing the data set of the particular workpiece;

determining current conditions using the analysis;

comparing the current conditions to expected conditions; and

responding to the comparison, wherein responding includes triggering a warning when the current conditions depart from the expected conditions.

40. (Original) The method of claim 39, wherein the fabrication data items are measured from production data sources.

41. (Original) The method of claim 40, wherein the production data source is a test probe.

42. (Original) The method of claim 40, wherein the production data source is a parametric measuring device.

43. (Original) The method of claim 40, wherein the production data source is one in which film thickness is being measured.

44. (Original) The method of claim 40, wherein the production data source is one in which critical dimensions are being measured.

45. (Currently Amended) A method comprising:

responding to conditions in an electronic device fabrication facility, including:

determining each route one or more workpieces follows during fabrication, wherein each route includes at least one operation including a plurality of subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the one or more workpiece and wherein each route includes no more than one of the plurality of subdivisions;

separately for each route, measuring fabrication data items relevant to each route including measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility,

determining an exact route a particular workpiece followed during fabrication;

measuring production data related to the particular workpiece, wherein the production data includes at least one measurement taken directly on the workpiece included in the lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data related to the entire electronic device fabrication facility and taken from sources not directly related to the at least one manufacturing process;

storing measured data items relevant to the exact route the particular workpiece followed during fabrication including the measured production data for the particular workpiece and the measured facility data during fabrication of the lot in a data set of the workpiece;

analyzing the data set of the particular workpiece;

determining current conditions using the analysis;

comparing the current conditions to expected conditions; and

responding to the comparison, wherein responding includes triggering a warning when the current conditions depart from the expected conditions.

46. (Previously Presented) The method of claim 45, wherein measured data items relevant to the route the particular workpiece actually followed during fabrication is relevant based on physical proximity to the route.

47. (Previously Presented) The method of claim 45, wherein measured data items relevant to the route the particular workpiece actually followed during fabrication is relevant based on manufacturing result.

48. (Original) The method of claim 45, wherein the data processing device is a computer system containing a relational database on a storage device and executed on a processor.

49. (Previously Presented) The method of claim 45, wherein storing measured-data items in a data processing device includes:

adding a data item from the measured route fabrication data items relevant to that route to the data set of the particular workpiece; and

relating the added data item to the previously stored data items by some point of data commonality.

50. (Original) The method of claim 49, wherein point of data commonality is based on time.

51. (Currently Amended) A method comprising:

responding to conditions in an electronic device fabrication facility, including:

determining each route one or more workpieces follows during fabrication, wherein each route includes at least one operation including a plurality of subdivisions, each of the plurality of subdivisions operable to perform a substantially similar operation to the one or more workpieces and wherein each route includes no more than one of the plurality of subdivisions;

separately for each route, measuring fabrication data items relevant to each route including measuring production data related to at least one manufacturing process performed during fabrication of the lot produced in the electronic device fabrication facility,

determining an exact route a particular workpiece followed during fabrication;

measuring production data related to the particular workpiece, wherein the production data includes at least one measurement taken directly on the workpiece included in the lot, and at least one measurement of conditions of the manufacturing process performed during fabrication of the lot that is not taken directly on the workpiece;

measuring facility data during the fabrication of the lot, the facility data related to the entire electronic device fabrication facility and taken from sources not directly related to the at least one manufacturing process;

storing measured data items relevant to the exact route the particular workpiece followed during fabrication including the measured production data for the particular workpiece and the measured facility data during fabrication of the lot in a data set of the workpiece;

performing an analysis on the data set of the particular workpiece on a data processing device;

determining current conditions using the analysis;

non-manually comparing the current conditions to expected conditions; and

responding to the comparison, wherein responding includes triggering a warning when the current conditions depart from the expected conditions.

52. (Original) The method of claim 51, wherein the analysis is a statistical analysis.

53. (Original) The method of claim 51, wherein the analysis is a trend analysis.

54. (Original) The method of claim 51, wherein the analysis is a correlation study.

55. (Original) The method of claim 51, wherein responding includes:

alerting a user when the comparison shows an unexpected condition.

56. (Original) The method of claim 55, wherein the alerting is by visual cues on an output device of the data processor.

57. (Original) The method of claim 55, wherein the alerting is by the data processor sending a message to the user of an unexpected condition.

58. (Original) The method of claim 55, wherein the data processing device non-manually halts production when an unexpected condition occurs.

59. (Original) The method of claim 51, wherein responding includes:

not alerting a user when the comparison shows expected conditions in the fabrication facility.

60. (Original) The method of claim 51, wherein responding includes:

non-manually continuing fabrication when the comparison shows expected conditions in the fabrication facility.

61. (Previously Presented) The method of claim 1, wherein applying a process control to the route based on the analysis includes continuing a particular manufacturing process based on the analysis.

62. (Previously Presented) The method of claim 1, applying a process control to the route based on the analysis includes stopping a particular manufacturing process based on the analysis.

63. (Previously Presented) The method of claim 29, wherein responding to the comparison when the current conditions depart from the expected conditions includes sending a message over a network.

64. (Previously Presented) The method of claim 29, wherein responding to the comparison when the current conditions depart from the expected conditions includes a non-manual shutting down of one or more fabrication machines in a group related to the particular route.